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Search	Most Recent Queries	Time	Result
#9	Search **#6 and characterization**	10:09:25	27
#8	Search **#5 or #6 and eukaryote**	10:09:04	0
#7	Search **#5 or #6**	10:08:51	248
#6	Search **#5 and purification**	10:08:15	104
#5	Search **#4 and coli**	10:07:51	248
#4	Search **#1 or #3**	10:07:38	498
#3	Search **membrane and refolding**	10:07:31	355
#2	Search **#1 and coli**	10:07:04	140
#1	Search **membrane and refolded**	10:06:46	218

Clear History

The concise
Biotech Dictionary
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detergent

A substance which has a nonpolar, hydrophobic part (avoids water) and a polar, hydrophilic part (attracted to water). It can dissolve fats and oils (collectively, lipids) with the hydrophilic end, and as a result can increase the cleaning abilities of its solvents (whatever it's dissolved in).

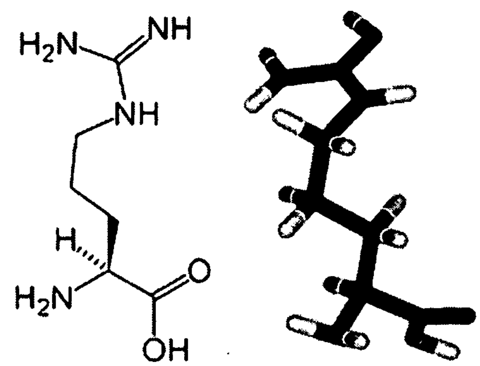
Selected detergent links:

Arginine

From Wikipedia, the free encyclopedia

Arginine (Arg) is an α-amino acid. The L-form is one of the 20 most common natural amino acids. In mammals, arginine is classified as a semiessential or conditionally essential amino acid, depending on the developmental stage and health status of the individuals.

Arginine



Chemical structure of L-arginine

Systematic name	2-amino-5-(diaminomethylidene amino)pentanoic acid
Chemical formula	$C_6H_{14}N_4O_2$
Molecular mass	174.2 g mol^{-1}

Complete data

Contents

Structure

Arginine can be considered to be an amphipathic amino acid as the part of the side chain nearest to the backbone is long, carbon-containing and hydrophobic, whereas the end of the side chain is a complex guanidinium group. With a pK_a of 12.48, the guanidinium group is positively charged in neutral, acidic and even most basic environments. Because of the conjugation between the double bond and the nitrogen lone pairs, the positive charge is delocalized. This group is able to form multiple H-bonds.

Synthesis

Arginine is synthesized from citrulline by the sequential action of the cytosolic enzymes argininosuccinate synthetase (ASS) and argininosuccinate lyase (ASL). This is energetically costly, as the synthesis of each molecule of argininosuccinate requires hydrolysis of adenosine triphosphate (ATP) to adenosine monophosphate (AMP); i.e., two ATP equivalents.

Citrulline can be derived from multiple sources:

- from arginine via nitric oxide synthase (NOS);
- from ornithine via catabolism of proline or glutamine/glutamate;
- from asymmetric dimethylarginine (ADMA) via DDAH.

The pathways linking arginine, glutamine, and proline are bidirectional. Thus, the net utilization or production of these amino acids is highly dependent on cell type and developmental stage.

On a whole-body basis, synthesis of arginine occurs principally via the intestinal–renal axis, wherein epithelial cells of the small intestine, which produce citrulline primarily from glutamine and glutamate, collaborate with the proximal tubule cells of the kidney, which extract citrulline from the circulation and convert it to arginine, which is returned to the circulation. Consequently, impairment of small bowel or renal function can reduce endogenous arginine synthesis, thereby

increasing the dietary requirement.

Synthesis of arginine from citrulline also occurs at a low level in many other cells, and cellular capacity for arginine synthesis can be markedly increased under circumstances that also induce iNOS. Thus, citrulline, a coproduct of the NOS-catalyzed reaction, can be recycled to arginine in a pathway known as the **citrulline-NO** or **arginine-citrulline pathway**. This is demonstrated by the fact that in many cell types, citrulline can substitute for arginine to some degree in supporting NO synthesis. However, recycling is not quantitative because citrulline accumulates along with nitrate and nitrite, the stable end-products of NO, in NO-producing cells [1].

Function

Arginine plays an important role in cell division, the healing of wounds, removing ammonia from the body, immune function, and the release of hormones.

In proteins

The geometry, charge distribution and ability to form multiple H-bonds make arginine ideal for binding negatively charged groups. For this reason arginine prefers to be on the outside of the proteins where it can interact with the polar environment. Incorporated in proteins, arginine can also be converted to citrulline by PAD enzymes. In addition, arginine can be methylated by protein methyltransferases.

As a precursor

Arginine is the immediate precursor of NO, urea, ornithine and agmatine; is necessary for the synthesis of creatine; and can be used for the synthesis of polyamines (mainly through ornithine and to a lesser degree through agmatine), citrulline, and glutamate. For being a precursor of NO, (relaxes blood vessels), arginine is used in many conditions where vasodilation is required. The presence of asymmetric dimethylargine (ADMA), a close relative, inhibits the nitric oxide reaction; therefore, ADMA is considered a marker for vascular disease, just as L-arginine is considered a sign of a healthy endothelium.

Implication in herpes simplex viral replication

Tissue culture studies have shown the suppression of viral replication when the lysine to arginine ratio *in vitro* favors lysine. The therapeutic consequence of this finding is unclear, but dietary arginine may affect the effectiveness of lysine supplementation. [2]

Implication in contributing to risk of death from heart disease

A recent Johns Hopkins study testing the addition of L-arginine to standard postinfarction treatment has implicated L-arginine supplementation with an increased risk of death. [3]

Sources

It can be found in any protein containing foods such as meat, poultry, dairy products, fish, etc. Foods high in arginine include chocolate, peanuts and walnuts.

References

1. ^a Enzymes of arginine metabolism *J Nutr. 2004 Oct; 134(10 Suppl): 2743S-2747S; PMID 15465778 (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15465778)* Free text (http://www.nutrition.org/cgi/content/full/134/10/2743S)

2. [a] Griffith RS, Norins AL, Kagan C. (1978). "A multicentered study of lysine therapy in Herpes simplex infection". *Dermatologica.* **156** (5): 257-267. PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=640102&query_hl=14&itool=pubmed_docsum).
3. [a] Arginine Therapy in Acute Myocardial Infarction *JAMA. 2006 Jan; Vol.295 #1: 58-64; PMID 16391217 (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=16391217)* Abstract (http://jama.ama-assn.org/cgi/content/short/295/1/58)

External links

- NIST Chemistry Webbook (http://webbook.nist.gov/cgi/cbook.cgi?ID=C74793&Units=SI&Mask=4#Thermo-Phase)

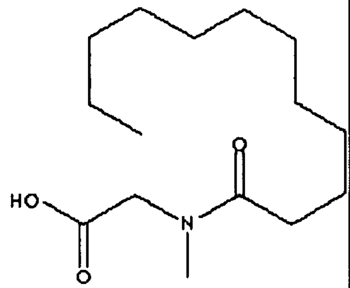
- Link page to external chemical sources.

The 20 Common Amino Acids
Alanine (dp) | **Arginine** (dp) | Asparagine (dp) | Aspartic acid (dp) | Cysteine (dp) | Glutamic acid (dp) | Glutamine (dp) | Glycine (dp) | Histidine (dp) | Isoleucine (dp) | Leucine (dp) | Lysine (dp) | Methionine (dp) | Phenylalanine (dp) | Proline (dp) | Serine (dp) | Threonine (dp) | Tryptophan (dp) | Tyrosine (dp) | Valine (dp)
Essential amino acid | Protein | Peptide | Genetic code
Primary structure→

Retrieved from "http://en.wikipedia.org/wiki/Arginine"

Categories: Articles with unsourced statements | Essential amino acids | Basic amino acids

N-LAUROYL SARCOSINE



PRODUCT IDENTIFICATION	
CAS NO.	97-78-9
EINECS NO.	202-608-3
FORMULA	$C_{15}H_{29}NO_3$
MOL WT.	271.40
H.S. CODE	
DERIVATION	
TOXICITY	
SYNONYMS	N-methyl-N-(1-oxododecyl)-Glycine; Lauroyl sarcosine; N-Cocoyl Sarcosinate; Lauroyl Sarcosinate; Sarcosyl L; Crodasinic L; N-Lauroylsarkosin (German); N-Lauroilsarcosina (Spanish); N-Lauroylsarcosine (French);
CLASSIFICATION	
PHYSICAL AND CHEMICAL PROPERTIES	
PHYSICAL STATE	Pale yellow crystalline solid
MELTING POINT	34 - 37 C
BOILING POINT	
SPECIFIC GRAVITY	0.97 - 0.99
SOLUBILITY IN WATER	
pH	
VISCOSITY	
AUTOIGNITION	
REFRACTIVE INDEX	
NFPA RATINGS	Health: 1; Flammability: 0; Reactivity: 0
FLASH POINT	
STABILITY	Stable under ordinary conditions

APPLICATIONS

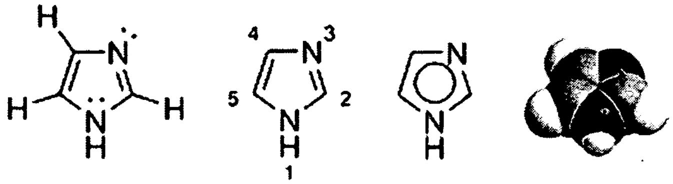
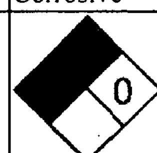
Sarcosine , also known as methyl-glycoccoll, is an amino acid intermediate naturally found in the metabolism of choline to glycine. Commercially, synthetic sarcosine is obtained by the reaction of methylamine with monochloracetic acid. It is adeliquescent crystal; sweet taste; dissolve in water, slightly soluble in alcohol; decomposes at 208 C. It is used in manufacturing biodegradable surfactants and toothpastes as well as in biological applications. Sarcosinate Surfactants are mild, biodegradable anionic surfactants derived from fatty acids and sarcosine (amino acid). These compounds fovor lather building and resistance to sebum delathering in cleaners, polymers, industrial chemicals, petroleum and lubricant products.

SALES SPECIFICATION	
APPEARANCE	Pale yellow crystalline solid
ACTIVE MATTER	94.0% min
FREE FATTY ACID	6.0% max
COLOR (GARDNER)	2 max
TRANSPORTATION	
PACKING	200kgs in Drum
HAZARD CLASS	
UN NO.	
OTHER INFORMATION	

We are pleased to receive your any questions or remarks. You may contact us at the following numbers and e-mail address for additional information.
Fax : + 82 + 2 + 783-8063 , + 82 + 2 + 3775-3073 (Seoul, Korea)

Imidazole

From Wikipedia, the free encyclopedia

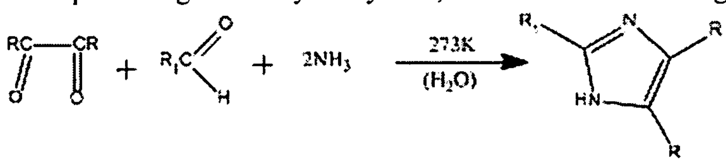
Imidazole	
	
General	
Systematic name	1,3-diazole
Other names	Imidazole 1,3-Diaza-2,4-cyclopentadiene
Molecular formula	$C_3H_4N_2$
Molar mass	68.08 g/mol
Appearance	white or pale yellow solid
CAS number	[288-32-4]
Properties	
Density and phase	0.6 g/cm^3, solid
Solubility in water	miscible
Melting point	89-91 °C (362-364 K)
Boiling point	256 °C (529 K)
Acidity (pK_a)	pK_a=14.5
Basicity (pK_b)	pK_b=7.0
Structure	
Coordination geometry	planar 5-membered ring
Crystal structure	monoclinic
Dipole moment	12.8 Cm*10^{30}
Hazards	
MSDS	External MSDS (http://www.jtbaker.com/msds/englishhtml/i0080.htm)
Main hazards	Corrosive
NFPA 704	
Flash point	146 °C
RTECS number	N13325 1985-86
Supplementary data page	
Structure and properties	n, ε_r, etc.
Thermodynamic data (http://webbook.nist.gov/cgi/cbook.cgi?ID=C288324&Units=SI&Mask=2#Thermo-Condensed)	Phase behaviour Solid, liquid, gas
Spectral data (http://webbook.nist.gov/cgi/cbook.cgi?ID=C288324&Units=SI&Mask=400#UV-Vis-Spec)	UV, IR, NMR, MS
Except where noted otherwise, data are given for materials in their standard state (at 25 °C, 100 kPa) Infobox disclaimer and references	

Imidazole is a heterocyclic aromatic organic compound. It is further classified as an alkaloid. Imidazole refers to the parent compound $C_3H_4N_2$, while imidazoles are a class of heterocycles with similar ring structure but varying substituents. This ring system is present in important biological building blocks such as histidine and histamine. Imidazole can act as a base and as a weak acid. Imidazole exists in two tautomeric forms with the hydrogen atom moving between the two nitrogens. Many drugs contain an imidazole ring, such as antifungal drugs and nitroimidazole.

Contents

Discovery

Imidazole was first synthesized by H. Debus in 1858, but various imidazole derivatives had been discovered as early as the 1840's. His synthesis, as shown below, used glyoxal and formaldehyde in ammonia to form imidazole. This synthesis, while producing relatively low yields, is still used for creating C-substituted imidazoles.

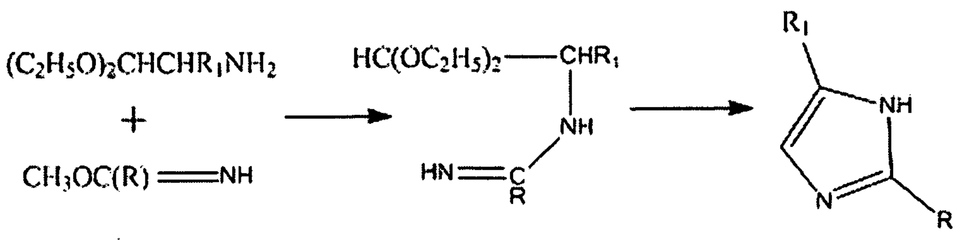


Preparation

Imidazole can be synthesized by numerous methods besides the Debus method. Many of these syntheses can also be applied to different substituted imidazoles and imidazole derivatives simply by varying the functional groups on the reactants. In literature, these methods are commonly categorized by which and how many bonds form to make the imidazole rings. For example, the Debus method forms the (1,2), (3,4), and (1,5) bonds in imidazole, using each reactant as a fragment of the ring, and thus this method would be a three bond forming synthesis. A small sampling of these methods is presented below.

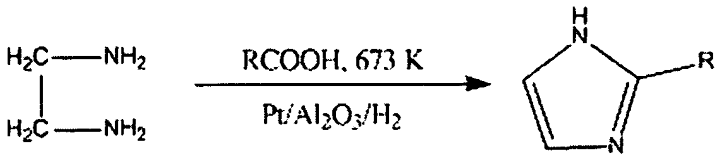
- Formation of One Bond

The (1,5) or (3,4) bond can be formed by the reaction of an imidate and an α-aminoaldehyde or α-aminoacetal resulting in the cyclization of an amidine to imidazole. The example below applies to imidazole when $R=R_1$=Hydrogen.

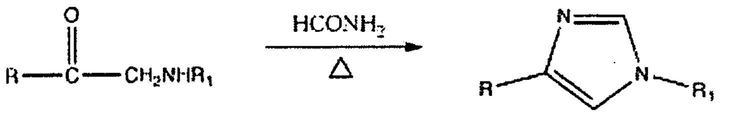


- Formation of Two Bonds

The (1,2) and (2,3) bonds can be formed by treating a 1,2-diaminoalkane, at high temperatures, with an alcohol, aldehyde, or carboxylic acid. A dehydrogenating agent, such as platinum with alumina, must be present in the reaction for the imidazole to form. The example below applies to imidazole when R=Hydrogen.

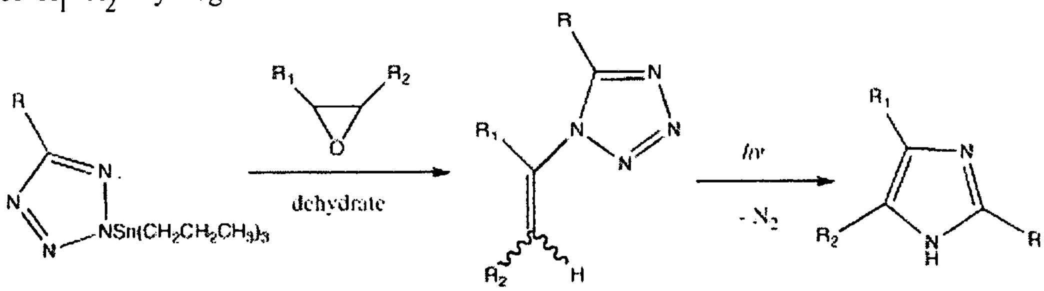


The (1,2) and (3,4) bonds can also be formed from N-substituted α-aminoketones and formamide and heat. The product will be a 1,4-disubstituted imidazole, but here since $R=R_1$=Hydrogen, imidazole itself is the product. The yield of this reaction is moderate, but it seems to be the most effective method of making the 1,4 substitution.



- Formation from other Heterocycles

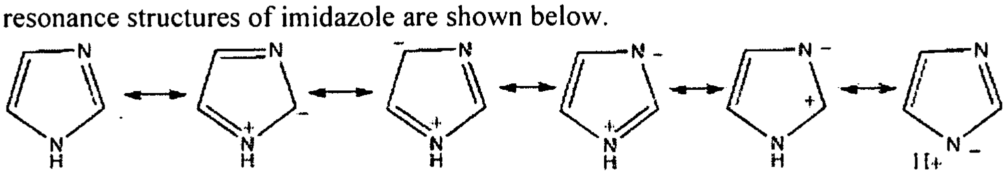
Imidazole can be synthesized by the photolysis of 1-vinyltetrazole. This reaction will only give substacial yields if the 1-vinyltetrazole is made efficiently from a 2-tributylstannyltetrazole. The reaction, shown below, produces imidazole when $R=R_1=R_2$=Hydrogen.



Imidazole can also be formed in a vapor phase reaction. The reaction occurs with formamide, ethylenediamine and hydrogen over plat- inum on alumina, and it must take place between 340 to 480 °C. This forms a very pure imidazole product.

Structure and properties

Imidazole is a 5 membered planar ring which is soluble in water and polar solvents. The compound has an aromatic sextet which consists of one π electron from the =N- atom and one from each carbon atom, and two from the NH nitrogen. The resonance structures of imidazole are shown below.

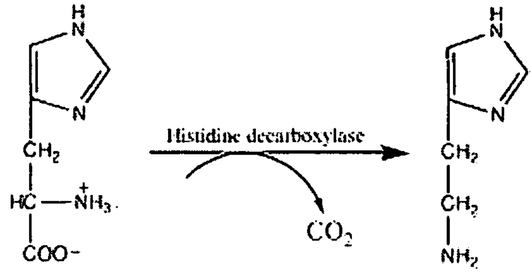


Imidazole is a base and an excellent nucleophile. It reacts at the NH nitrogen, attacking alkylating and acylating compounds. It is not particularly susceptible to electrophilic attacks at the carbon atoms, and most of these reactions are substitutions that keep the aromaticity intact. One can see from the resonance structure that the carbon-2 is the carbon most likely to have a nucleophile attack it, but in general nucleophilic substitutions are difficult with imidazole.

Biological significance and applications

Imidazole is incorporated into many important biological molecules. The most obvious is the amino acid histidine, which has an imidazole side chain. Histidine is present in many proteins and enzymes and plays a vital part in the structure and binding functions of hemoglobin. Histidine can be decarboxylated to histamine, which is also a common biological

compound. It is a component of the toxin which causes urticaria, which is basically an allergic reaction. The structures of both histidine and histamine are:



One of the application of imidazole in the purification of His-tagged proteins in immobilised metal affinity chromatography(IMAC). Imidazole is used to elute tagged proteins bound to Ni ions attached to the surface of beads in the chromatography column. Imidazole binds to the Ni with higher affinity than His-tags. As a result, imidazole binds the surface of the bead, freeing the His-tagged proteins.

Imidazole has become an important part of many pharmaceuticals. Synthetic imidazoles are present in many fungicides and antifungal, antiprotozoal, and antihypertensive medications. Imidazole is part of the theophylline molecule, found in tea leaves and coffee beans, which stitmulates the central nervous system. It is present in the anticancer medication mercaptopurine, which combats leukemia by inferring with DNA activities.

Industrial applications

Imidazole has been used extensively as a corrosion inhibitor on certain transition metals, such as copper. Preventing copper corrosion is important, especially in aqueous systems, where the conductivity of the copper decreases due to corrosion.

Many compounds of industrial and technological importance contain imidazole. The thermostable polybenzimidazole PBI contains imidazole fused to a benzene ring and linked to a benzene and acts as a fire retardant. Imidazole can also be found in various compounds which are used for photography and electronics.

Salts of imidazole

Salts of imidazole are known as imidazolium salts. These salts are formed from the protonation or substitution at nitrogen of imidazole. These salts have been used as ionic liquids and precursors to stable carbenes.

Related heterocycles

- Benzimidazole, an analog with a fused benzene ring. idem: benzimidazoline
- Dihydroimidazole, an analog where 4,5-double bond is saturated.
- Pyrrole, an analog with only one nitrogen atom in position 1.
- Oxazole, an analog with the nitrogen atom in position 1 replaced by oxygen.
- Thiazole, an analog with the nitrogen atom in position 1 replaced by sulfur.
- Pyrazole, an analog with two adjacent nitrogen atoms.

References

1. Katritzky; Rees. *Comprehensive Heterocyclic Chemistry.* Vol. 5, p.469-498, **(1984)**.
2. Grimmett, M. Ross. *Imidazole and Benzimidazole Synthesis.* Academic Press, **(1997)**.
3. Brown, E.G. *Ring Nitrogen and Key Biomolecules.* Kluwer Academic Press, **(1998)**.
4. Pozharskii, A.F, et.al. *Heterocycles in Life and Society.* John Wiley & Sons, **(1997)**.
5. Heterocyclic Chemistry TL Gilchrist, The Bath press 1985 ISBN 0582014212

External links

- Link page to external chemical sources.

Suppliers

- Fisher Scientific (https://www1.fishersci.com/Coupon?cid=1334&gid=148084)
- Sigma-Aldrich (http://www.sigmaaldrich.com/catalog/search/ProductDetail/SIAL/I2399)
- BASF (http://www.basf.com/specialtyintermediates/imidazoles.html)

Retrieved from "http://en.wikipedia.org/wiki/Imidazole"

Categories: Nitrogen heterocycles | Simple aromatic rings | Alkaloids